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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,435	11/12/2003	David E. Lanar	003/285/SAP	7145

7590 02/27/2007

ATTN: MCMR-JA (Ms. Elizabeth Arwine-PATTENT ATTY)
U.S. Army Medical Research and Material Command
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Fort Detrick, MD 21702-5012

EXAMINER
VOGEL, NANCY S

ART UNIT	PAPER NUMBER
1636	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/706,435	LANAR ET AL.	
	Examiner	Art Unit	
	Nancy T. Vogel	1636	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-93* is/are pending in the application.

4a) Of the above claim(s) *5,10-38,43,45,47,48,53,58,63 and 65-90* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-9,39-42,44,46,49-52,54-57,59-62,64 and 91-93* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-93 are pending in the case.

Election/Restrictions

Applicant's election with traverse of Group I, claims 1-10, 39-44, 46, 47, 49-64, and limited to SEQ ID NO:25 and 26, in the reply filed on 8/16/06 is acknowledged. Claims 5, 10, 43, 47, 53, 58, 63, are withdrawn as being drawn to a non-elected invention. The traversal is on the ground(s) that claims 91 and 92 are drawn to a vaccine comprising the recombinant LSA-NRC, and that a search for the polypeptide and an immunogenic composition comprising the polypeptide will necessarily cover the invention of claims 91 and 92 without imposing and undue search or burden. This is found persuasive and claims 91 and 92, and also new claim 93, are rejoined and examined. Applicants also traverse on the basis of the requirement to select one sequence for examination, arguing that "complete search for the LSA polypeptide will necessarily cover the LSA epitopes and variations listed in the claims". This is not found persuasive because it is noted that the claims recite a recombinant polypeptide that may comprise any combination of a large number of elements (i.e. any of parts i-iv, and part vi recites one or more epitope specified in SEQ ID NO:6-23). Therefore, the number of sequences encompassed is very large. While all of the elements may be a part of the large LSA polypeptide, the claims are not limited to this polypeptide, and a search of the LSA sequence would not be the only search necessary. Claims 1-4, 6-9,

39-42, 44, 46, 49-52, 54-57, 59-62, 64 and 91-93, limited to SEQ ID NO:26, are under examination.

The requirement is still deemed proper and is therefore made FINAL.

Claims 5, 10, 11-38, 43, 45, 47, 48, 53, 58, 63, 65-90 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 8/16/06.

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:
Non-initialed and/or non-dated alterations have been made to the oath or declaration. See 37 CFR 1.52(c).

Specification

The disclosure is objected to because of the following informalities: page 29 contains blanks.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 91-93 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The factors considered when determining if the disclosure satisfies the enablement requirement and whether any necessary experimentation is undue include, but are not limited to: 1) nature of the invention, 2) state of the prior art, 3) relative skill of those in the art, 4) level of predictability in the art, 5) existence of working examples, 6) breadth of claims, 7) amount of direction or guidance by the inventor, and 8) quantity of experimentation needed to make or use the invention. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

The nature of the invention is a vaccine for protection against infection with more than one strain of P. falciparum comprising LSA-NRC polypeptides from more than one strain of P. falciparum.

The state of the prior art: The prior art has taught that no vaccine has been shown to be effective against infection with P. falciparum, and the problems involved in developing such a vaccine are long standing and complex. An article concerning malaria vaccines states that "while particular parts of the parasite using in subunit vaccines can mobilize some of our defences, it is difficult to get our full immunological

artillery into action. So vaccines may stimulate antibody production, but have little impact on T cells, and antibodies on their own cannot eliminate the parasite. But eve if Plasmodium-specific T cells are generated, they do not always protect against malaria. An in many cases, the immune response is so short-lived that it would be of little practical value" (page 2). Phillips et al. (Clin. Microbiol. Rev., Jan. 2001, 14(1): 208-226), disclose that a malaria vaccine represents a major challenge, even with unlimited resources to devote to the task" and discloses that development of a vaccine is "particularly difficult (page 218) and "selecting targets for vaccine-induced immunity and the corresponding peptides with which to induce that immunity has been extremely difficult. Many of the immunodominant antigens in natural infections have not been shown to be targets of protective immunity (page 218). The reference discloses such complicating facts as animal models are not ideal for evaluating vaccine candidates to be used in humans, and there is no suitable in vitro assay for measuring levels of protective immunity in vivo, for example, being able to relate levels of antibody to a specific antigen to the level of protection in vivo. Therefore, the only way of determining , at present, the efficacy of a vaccine candidate is to set up human trials, involving natural or experimental challenge, which are very expensive and take a long time to complete and evaluate" (page 218).

Breadth of the claims: The claims are broad since they are drawn to vaccines which protect against infection more than one P. falciparum strain, using any LSA-NRC polypeptide, which is defined in the specification as any recombinant protein that contains a series of amino acids from the P. falciparum native LSA-1 and that

comprises an amino acid sequence defining at least one LSA-1 epitope" (page 18), and therefore the term encompasses any number and arrangement of a series of amino acid fragments which are "epitopes", or portion of the LSA-1 polypeptide that are recognized by the immune system.

Amount of guidance provided by application: The application does not disclose the regions or epitopes of the LSA-1 polypeptide which would need to be present in order to provide a protective immune reaction against P. falciparum in humans.

Amount of experimentation required to practice the invention: The amount of experimentation needed to practice or make the invention is extensive, and perhaps unlimited, since there is ample evidence in the art showing that a vaccine which provides protection against the infection by P. falciparum is very difficult, and perhaps, impossible, to develop. Therefore, it is unclear whether any epitopes of the LSA-1 molecule would provide protection against infection with Pl falciparum.

Claims 1-4, 6-9, 39-42, 44, 46, 49-52, 54-57, 59-62, 64 and 91-92, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 8, 39, 44, 54, 59, 64, 91, 92 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 and by dependence claims 8, 39, 44, 54, 59, 64, are vague and indefinite in the recitation of "said polypeptide is harmonized", since it is not clear what is intended by this phrase. The specification discloses, and the art defines, that nucleic acids may be harmonized by using codons which have increased frequency in the host in which the gene is being expressed; however, the sequence of the polypeptide remains the same whether or not harmonization of the nucleic acid has taken place. Therefore, it is not clear what is intended by a "harmonized polypeptide".

Claims 2 and by dependence claims 3-5, 7-9, 39, 41, 42, 44, 46, 51, 54-57, 59-62, 64, 93 are vague and indefinite in the recitation of "LSA-1 N-terminal" and "LSA-1 C-terminal" since it is not clear what is intended to be encompassed by these phrases.

Claims 91 and by dependence claim 92 are vague and indefinite in the recitation of "NF43, and (what about other strains)camp". It cannot be determined what is intended by the claims.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6-8, 39-41, 44, 50, 51, 54, 55, 56, 59-61, 64, , are rejected under 35 U.S.C. 102(b) as being anticipated by Londono et al. (J. Immunol. 145: 1557-1563, 1990).

Londono et al. disclose an isolated recombinant polypeptide comprising epitope from P. falciparum LSA (see Table 1). The epitope may be the 17 amino acid repeat unit (see paragraph bridging pages1557 and 1558). The reference discloses immunogenic compositions and vaccines comprising said polypeptide (see page 1559-1561).

Claims 1-4, 6-9, 39-42, 44, 46, 49-52, 54-57, 59-62, 64 and 91-93, are rejected under 35 U.S.C. 102(b) as being anticipated by Guerin-Marchand et al. (US Pat. 6,319,502) (cited by applicants).

Guerin-Marchand et al. disclose recombinant polypeptides, and immunogenic compositions comprising said polypeptides, which comprise at least one epitope of the LSA-1 polypeptide, such as the 17 amino acid repeat (see col. 3-6). The reference discloses kits comprising the polypeptide and in vitro detection means to detect the antigen-antibody complexes possibly formed in a test serum sample (col. 13, 45 - col. 14, line 41). The reference discloses immunogenic compositions comprising said polypeptide, and vaccines comprising said compositions (col. 15-16 and 21-22). The reference discloses kits for the in vitro diagnosis of malaria containing the polypeptide of the invention, reagents for detection of the antigen-antibody complexes produced by the immunological reaction, which may also be labeled, or be capable of being recognized

by a labeled reagent, and a reference tissue or biological fluid lacking antibodies recognized by the above-mentioned polypeptide compositions (col. 14, lines 26-42).

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nancy T. Vogel whose telephone number is (571) 272-0780. The examiner can normally be reached on 6:30 - 3:00, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Irem Yucel, Ph.D. can be reached on (571) 272-0781. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NV
2/20/07

NANCY VOGEL
PRIMARY EXAMINER